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WATER RESOURCES STUDY SAN FELIPE CREEK
WATERSHED RIO GRANDE RIVER, TEXAS

Federal Water Pollution Control Administration
Dallas, Texas

March 1964

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WATER RESOURCES STUDY SAN FELIPE CREEK WATERSHED RIO GRANDE RIVER, TEXAS

**Study of Potential Needs and Value of
Water Storage for Municipal, Industrial,
and Quality Control Purposes**

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**U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service, Region VII
Dallas, Texas
MARCH 1964**

WATER RESOURCES STUDY
SAN FELIPE CREEK WATERSHED
RIO GRANDE RIVER, TEXAS

Prepared for
U.S. Army Engineer District
Fort Worth, Texas

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service, Region VII
Division of Water Supply and Pollution Control
Dallas, Texas

MARCH 1964

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I. INTRODUCTION

Authority

In a letter dated February 14, 1963, the U.S. Army Engineer District, Fort Worth, Texas, requested the Public Health Service to make studies of the subject watershed ". . . to determine the municipal and industrial water requirements, the quality of water, the extent of existing and potential pollution, as well as the need for and the benefits from conservation storage for purposes of municipal and industrial water supply and of water quality control" This study, including projections to the year 2070, has been made in accordance with (1) the Water Supply Act of 1958 (Public Law 85-500, Title III, as amended by Public Law 87-88) and a Memorandum of Agreement between the Department of the Army and the Department of Health, Education, and Welfare, dated November 4, 1958; and (2) Public Law 84-660 as amended by Public Law 87-88.

Purpose and Scope

This report indicates the water requirements for municipal and industrial, and water quality control purposes to the year 2070 in the San Felipe Creek watershed, a tributary to the Rio Grande River located in Texas.

Acknowledgments

The cooperation of many persons and agencies is gratefully acknowledged. Special appreciation is expressed to the following:

U.S. Army Engineer District, Fort Worth, Texas
Texas Water Commission, Austin, Texas
Texas State Department of Health, Austin, Texas

II. SUMMARY AND CONCLUSIONS

Summary

1. The study area comprises Val Verde County, Texas. The entire watershed area is contained within this county.
2. The city of Del Rio is the major municipality in both the watershed and the county.
3. The water quality of existing and firmly planned sources is acceptable for municipal, industrial, and agricultural uses.

Conclusions

1. The study area's population is expected to grow to 50,000 by the year 2020 and 75,500 by the year 2070 from a base of 24,461 in 1960.
2. Projected study area municipal and industrial water supply needs are 13.5 million gallons per day (mgd) in 2020 and 22.8 in 2070. Similar needs of 11.1 mgd in 2020 and 19.2 mgd in 2070 are projected for the watershed.
3. Future water requirements in the watershed can be satisfied from the present source, San Felipe Springs.
4. There is no need for storage for regulation of streamflow for quality control.

III. DESCRIPTION OF THE WATERSHED

Location

The San Felipe Creek watershed is tributary to the Rio Grande River and is located in Val Verde County, Texas as shown in Figure III-1.

Stream Characteristics

San Felipe Creek is approximately 15 miles in length and drains an area of 46 square miles. It has one major tributary, Calaveras Creek, which enters the main stem at approximately mile 6. The base flow of San Felipe Creek is derived from San Felipe Springs located in the northeastern part of the city of Del Rio. The dependable yield of the springs is estimated by the Texas Water Commission to be about 55,000 acre-feet per annum.

Water Quality

The quality of the water from San Felipe Springs can be described as very good, and within the Public Health Service Drinking Water Standards limits, as shown in Table III-1.

Table III-1

Analysis of San Felipe Springs
By Texas State Department of Health
December 1959

<u>Item</u>	<u>Concentration (mg/l)</u>
Dissolved Solids	264
Chlorides	12
Sulfates	5
Flourides	0.2
Total Hardness as CaCO ₃	222
pH	6.9

IV. THE ECONOMY

The population trends and projections for the study area are shown in Figure IV-1. The population of this county is expected to reach 50,000 by the year 2020 and 75,500 by the year 2070. No breakdown of future population for the watershed is given; however, the urban population shown for Val Verde County can, for purposes of this study, be considered as the watershed population. The population projections are based on a resource and employment analysis of the area. A comparison of the present and projected Val Verde County labor force distribution is shown in Table IV-1.

Table IV-1

Present and Projected Labor Force Distribution

<u>Item</u>	<u>1960</u>		<u>2020</u>		<u>2070</u>	
	<u>Number</u>	<u>Per- cent</u>	<u>Number</u>	<u>Per- cent</u>	<u>Number</u>	<u>Per- cent</u>
Agriculture	681	11.3	600	3.2	500	1.7
Forestry and Fisheries	4	0.1	0	0	0	0
Mining	16	0.3	50	0.3	100	0.4
Manufacturing	448	7.4	3,350	17.6	5,400	18.8
Resource Oriented	125	2.1	1,100	5.8	1,800	6.3
Nonresource Oriented	323	5.3	2,250	11.8	3,600	12.5
Basic Total	1,149	19.1	4,000	21.1	6,000	20.9
Services	4,494	74.5	14,200	74.7	21,500	74.9
Unemployed	390	6.4	800	4.2	1,200	4.2
Total Labor Force	6,033	100.0	19,000	100.0	28,700	100.0

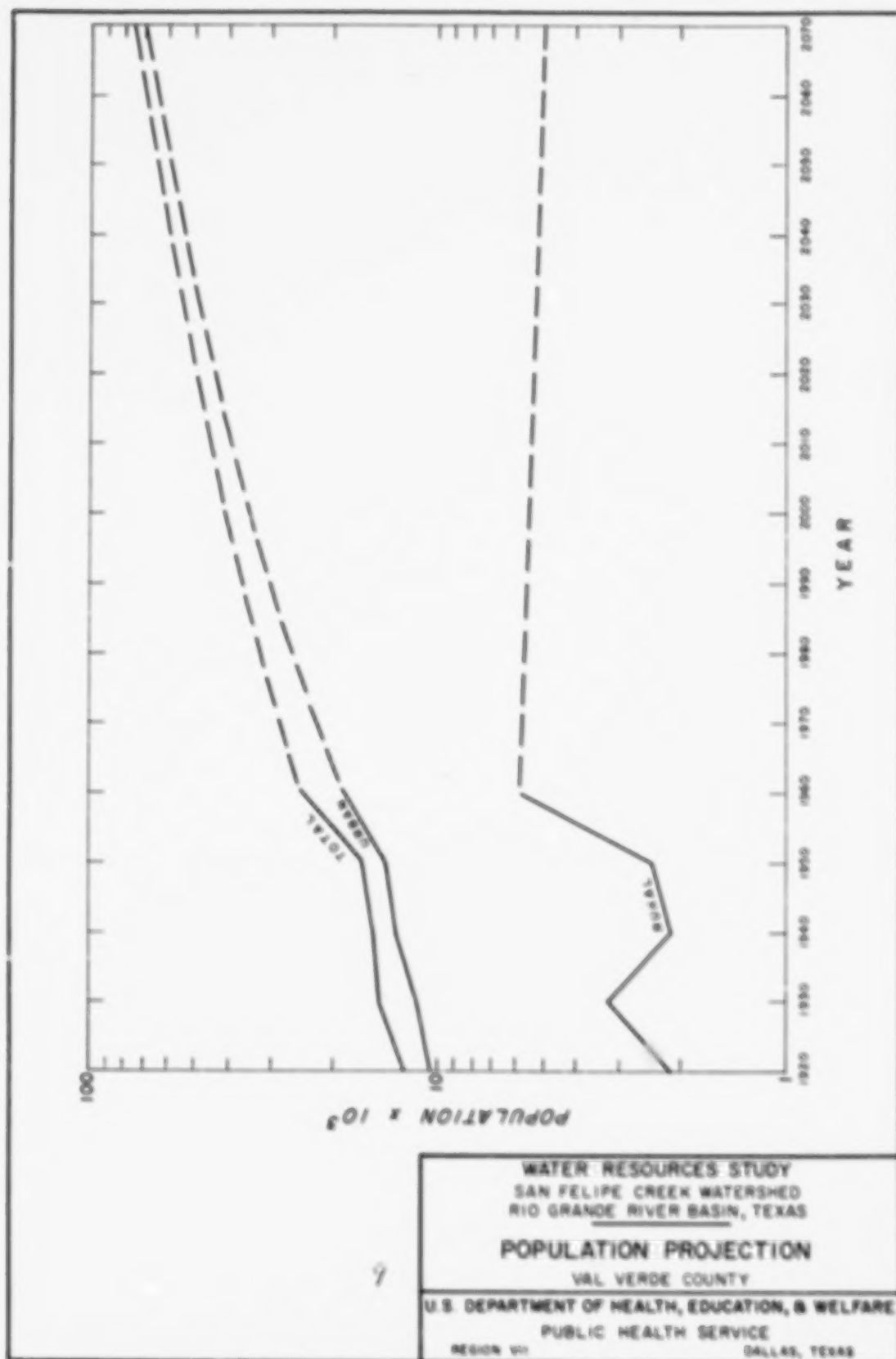


FIGURE IV-1



FIGURE III-1

V. WATER REQUIREMENTS

Based on the projected economic development and unit water uses in the county, the total future water requirement for the study area is expected to increase from 8.8 mgd in 1970 to 34.0 mgd in 2070. Similarly, the total water needs of the watershed are estimated to be 4.4 mgd and 19.2 mgd in 1970 and 2070, respectively. The estimated future water requirements for the county and watershed are listed by use in Table V-1. Irrigation requirements were developed from Texas Water Commission data and are shown so as not to understate the total water needs of the area.

Table V-1

	<u>Future Water Requirements (mgd)</u>				
	<u>1970</u>	<u>1995</u>	<u>2020</u>	<u>2045</u>	<u>2070</u>
VAL VERDE COUNTY					
Municipal	3.9	6.2	8.8	11.7	14.6
Industrial ^{1/}	1.1	2.8	4.7	6.3	8.2
Rural	0.3	0.4	0.4	0.4	0.4
Irrigation	<u>3.5</u>	<u>7.2</u>	<u>10.8</u>	<u>10.8</u>	<u>10.8</u>
Total	8.8	16.6	24.7	29.2	34.0
SAN FELIPE CREEK WATERSHED ONLY					
Municipal	3.9	6.2	8.8	11.7	14.6
Industrial ^{2/}	0.5	1.3	2.3	3.4	4.6
Rural	*	*	*	*	*
Irrigation	<u>*</u>	<u>*</u>	<u>*</u>	<u>*</u>	<u>*</u>
Total	4.4	7.5	11.1	15.1	19.2

^{1/} Includes thermal power generation.

^{2/} No thermal power generation in watershed.

* Negligible.

Laughlin Air Force Base is now and is expected to continue to be supplied by the city of Del Rio and is included in the watershed municipal figures above.

San Felipe Springs, with an estimated dependable yield of 49 mgd, is capable of satisfying all foreseeable municipal and industrial water needs in the watershed.

Using the best data presently available, it is concluded that there is no need for and no benefit from any additional municipal and industrial water supply.

Based on the assumption that secondary treatment will be provided for municipal and industrial wastes, no water quality problem is expected to occur in the watershed. The city of Del Rio and Laughlin Air Force Base are now and will continue to be the major contributors of wastes. Return flows from these sources amounted to 1.3 mgd in 1960 and are expected to increase to 5.8 mgd and 10.3 mgd by 2020 and 2070, respectively. Their proximity to the Rio Grande River, coupled with expected municipal and industrial, and irrigation releases of 156 mgd from the proposed Amistad Reservoir, will insure preservation of water quality; hence it is concluded that there is no need for storage for regulation of streamflow for quality control. However, the project should be restudied in the event that present estimates of water quantity and quality become altered.